

SOLVENT WASTE RECYCLING

FINAL REPORT

INDUSTRIAL WASTE DIVERSION PROGRAM

NOVEMBER 1996



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FINAL REPORT

INDUSTRIAL WASTE DIVERSION PROGRAM

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Report prepared for:

Waste Reduction Branch
Ontario Ministry of Environment and Energy

DISCLAIMER

This report was prepared for the Ontario Ministry of Environment and Energy as part of a Ministry funded project. The views and ideas expressed in this report are those of the author and do not necessarily reflect the views and policies of the Ministry of Environment and Energy, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.

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ABSTRACT

Our business uses solvents for various day to day operations. From reducing/thinning paints, to the cleaning of refinish equipment, to the final detailing prior to the vehicles delivery, solvents play a moderate role in the refinishing process. The product names of these solvents are: Glasurit 352-50 and Amsol Oss. The main chemicals which are found in both of these solvent blends are Ethyl Acetate, Butyl Acetate, and Toluene. Up until now, solvents were used until they became too contaminated to be effective. Subsequently, new solvents were purchased and the old were disposed of through a bonded liquid waste disposal company. This process was not very efficient, both, in terms of cost and quantity of waste produced, as well as the potential danger of storing excessive waste products. As monitored over the last twelve months, Canadian Auto Painters have saved approximately \$1300 in disposal and purchasing costs and are now running a much safer (less liquid waste in storage containers) operation. We have found the project to be a true success.

INTRODUCTION

Canadian Auto Painters has been an industry leader since it first opened the doors of its three bay garage in 1926. The automotive revolution that was changing the face of North America brought new industry to Brantford, Ontario and Canadian Auto Painters was the first to provide an automotive refinishing service to the people of Brant County. Growing with the community, and thanks to our customers confidence in our work, the once small business has become a state of the art refinishing and collision facility with twenty-five service bays.

Over the past six years Canadian Auto Painters has embarked on a project of modernization and expansion, and has made a major commitment to help keep our environment on the right track. Some of our major equipment purchases range from a paper compactor to a can crusher to R-12 and 134-A air-conditioning recovery and recharging stations. We have made an investment in everyone's future. Furthermore, we purchased North America's second Osavac Dustless Sanding System which extracts 98% of dust particles right at the source during the sanding phases prior to refinishing. We have also purchased the area's first Downdraft Refinishing System as well as our newest possession, **The AV SOLVENT RECYCLER EXXD.**

The main objective for undertaking this newest project (AV SOLVENT RECYCLER EXXD.) was to remove contaminants from waste solvents using a distillation process, thereby allowing us to re-claim our solvents for continuous re-use within our facility. This project reduces the purchase of new solvents, reduces the amount of waste leaving our building, and dramatically reduces the amount of liquid waste kept on our premise.

A proposal was submitted to the MOEE Industrial Waste Diversion Program in March of 1994 to request financial assistance for the project. We felt this was a potential area where both industry and environmental issues could benefit from a win-win scenario. The proposal involved the use of an **AV SOLVENT RECYCLER EXXD**, which separates waste materials from contaminated washing solvents, thus allowing the re-use of these solvents within our shop, while reducing the volume of hazardous waste to be disposed of.

THE PROJECT

IMPLEMENTATION

We began the project not only to reduce waste but we also saw an economic and safety advantage as well. In the early months of 1993 we began to look at alternate ways to reduce costs and to keep a safer work environment within our facility. After much research into solvent waste management companies, only to find a very competitive marketplace, we decided to look at what we could do in-house to help remedy this situation. In December of 1993 at an industry trade show we saw what was the best solution to our problems. **The AV SOLVENT RECYCLER EXXD.**

EQUIPMENT SELECTED

We chose the **AV SOLVENT RECYCLER EXXD** over a variety of different models, manufactures and suppliers for three main reasons. Of utmost importance we wanted a unit that was explosion proof. Although the cost of the unit was substantially higher, our company felt that the safety factor in conjunction with changing by-laws, both provincially and on a municipal level, would be the best choice in the long run for everyone. Furthermore, the unit has a stainless steel removable solvent tank, which means easier loading and quicker cycles. There are no filters to change with this model and, of the units researched, it is also the easiest to maintain and operate.

INSTALLATION/COMMISSIONING OF EQUIPMENT

The explosion proof unit was installed in an appropriately ventilated area. This unit was shipped as a portable, stand-alone unit that required little re-assembly. We basically just had to bring power to the unit.

TECHNICAL ASPECTS

See attached, document A and B.

PROJECT ECONOMICS, SUCCESSES and FAILURES

From January 1st/95 to December 22nd/95 **CANADIAN AUTO PAINTERS** has successfully ran 35 complete cycles. Each cycle represents approximately 24 litres of dirty, contaminated solvent being recycled, subsequently leaving us with 21 litres of clean, re-useable solvent. Thirty-five cycles multiplied by 21 litres of re-claimed solvent translates into 735 litres of recycled solvent. Seven hundred & thirty-five litres or 161.89 gallons multiplied by \$6.22 per gallon would be market value of new solvent, which translates into a saving of one thousand & six dollars, ninety-six cents (\$1006.96).

Thirty-five cycles multiplied by 24 litres of dirty contaminated waste equals 840 litres or 185 gallons of waste. One hundred and eighty-five gallons of waste multiplied by \$ 3.33 per gallon which would be market cost to have the waste removed by a bonded Solvent Company translates into six hundred & sixteen dollars, twelve cents (\$ 616.12) of disposal costs which we have diverted over the past year.

To summarize the above, we saved \$1006.96 by not having to purchase new solvent and \$616.12 by not having to dispose of the contaminated solvent through a bonded solvent waste disposal company. The combined savings totaled \$1623.08. To date we have approximately 105 litres of sludge waste or (23.13 gallons) on site derived from 35 cycles multiplied by 3 litres of waste. Disposal costs of sludge waste is approximately \$6.50 per gallon, leaving a waste disposal cost on-site of 23.13 gallons X \$6.50 = \$150.34. Furthermore, hydro expenses of approximately \$155.00 dollars factored in would leave a net saving's of **\$1317.74.**

We feel the project has matched our original estimate favourably, subsequently calling the project a true success!

DIAGRAM-PLANT LAYOUT

See attached, document C.

DETAILED INFORMATION

See attached, document D as a detailed log of recycling events. Totals as mentioned above.

RESULTS & CONCLUSIONS

In conclusion, the performance of the **AV 30 EEXD. SOLVENT RECYCLER** has compared favorably with our original objectives and estimates. We have been consistently achieving waste reduction of approx. 88% compared to our initial estimate (80-90%).

I believe as a business owner that the MOEE advertising programs in conjunction with the many environmental issues and concerns across the media have kept me constantly looking at ways to help our environment. With the advances generated by the computer age, technology can not only help our environment, but it can make it more cost effective for business as well. The financial grant which was awarded to our company by the Industrial Waste Diversion Program was just enough assistance to prioritize this project, and in turn help reduce our pay-back term on the **AV 30 EEXD. SOLVENT RECYCLER**. There is no doubt that this project was a complete success! **Reduce, Re-Use & Recycle.**

Summary of Dos & Don'ts.....

DOs

- Do your research on the equipment manufacturer
- Do make sure you checkout the codes and restrictions within your municipality
- Do make sure your recycler has a removable solvent tank for ease of loading and quickness of faster cycles

DON'Ts

- Don't base decision on price alone
- Don't purchase anything but explosion proof models
- Don't purchase anything less than a 26 litre capacity, as most solvents are purchased in 20 litre volumes

AV SOLVENT RECYCLER

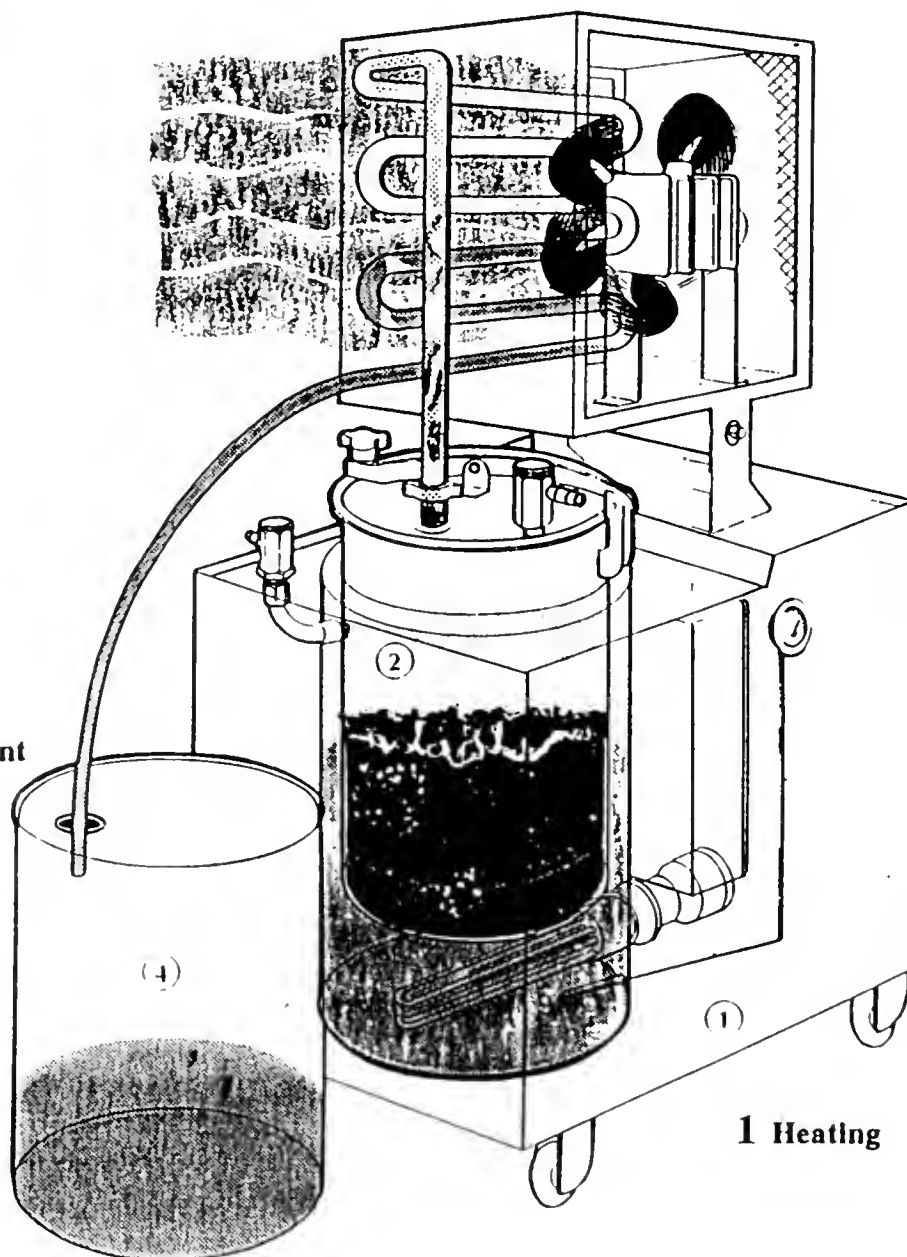
"Turn waste into money"

3 Condensation

4 Recovery of solvent

2 Evaporation

1 Heating



NO ODOURS OR VAPOURS

"B" ATTACHED

AV SOLVENT RECYCLERS/DISTILLERS REPRESENT AN IDEAL SOLUTION TO PROBLEMS OF WASTE MANAGEMENT OF CONTAMINATED SOLVENTS.

DISTILLATION is the chemical/physical process in which components are separated out from a mixture of liquids by boiling to form vapours, followed by condensation.

AV Solvent Recyclers provide complete separation of the original solvents from the various contaminating items (paints, inks, resins etc.), thus allowing for indefinite re-use of the former and appropriate disposal of the latter in their most concentrated form.

Original technical innovations developed on the basis of our experience allow our distillers to provide high efficiency with the highest safety margins.

DESCRIPTION OF MACHINE

in basic terms, the AV recycler consists of four fundamental elements.

BOILER:

Heated by thermal fluid, with electrical elements.

REMOVABLE TREATMENT TANK:

This can be replaced with a second tank currently being used to collect dirty solvents.

The removable treatment tank is an exclusive feature of AV recyclers. It provides for safety when processing flammable solvents and allows for the possibility of continuous cycling of the machine.

AIR-COOLED CONDENSER

ELECTRICAL CABINET WITH CONTROL PANEL:

The processing cycle is set to a pre-selected time and temperature, based on the nature and quantity of product to be treated. After manual start-up this cycle continues automatically until finished.

Maximum processing temperature is 180°C.

Safety devices automatically intervene in case of incorrect pressure, temperature or cooling valves.

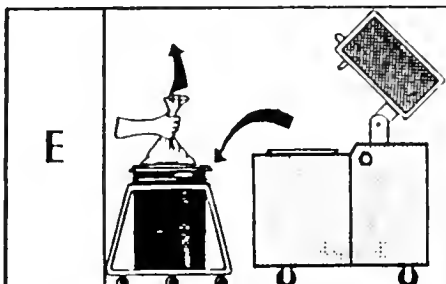
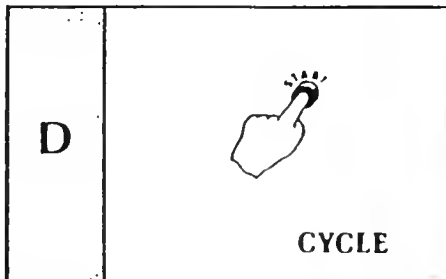
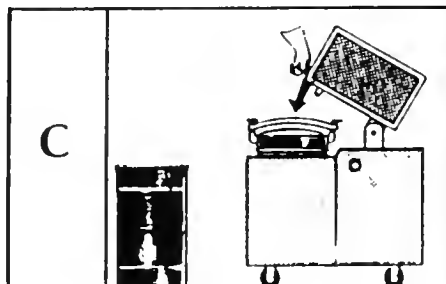
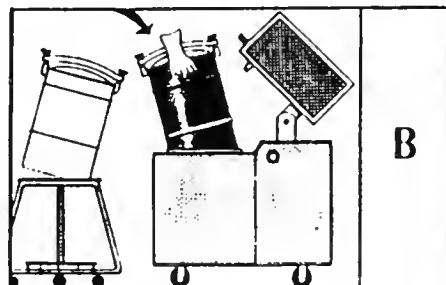
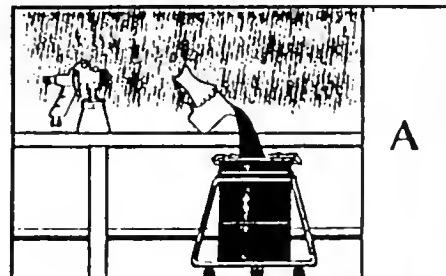
All electrical components are in strict conformity with current regulations and are approved by the main international authorities.

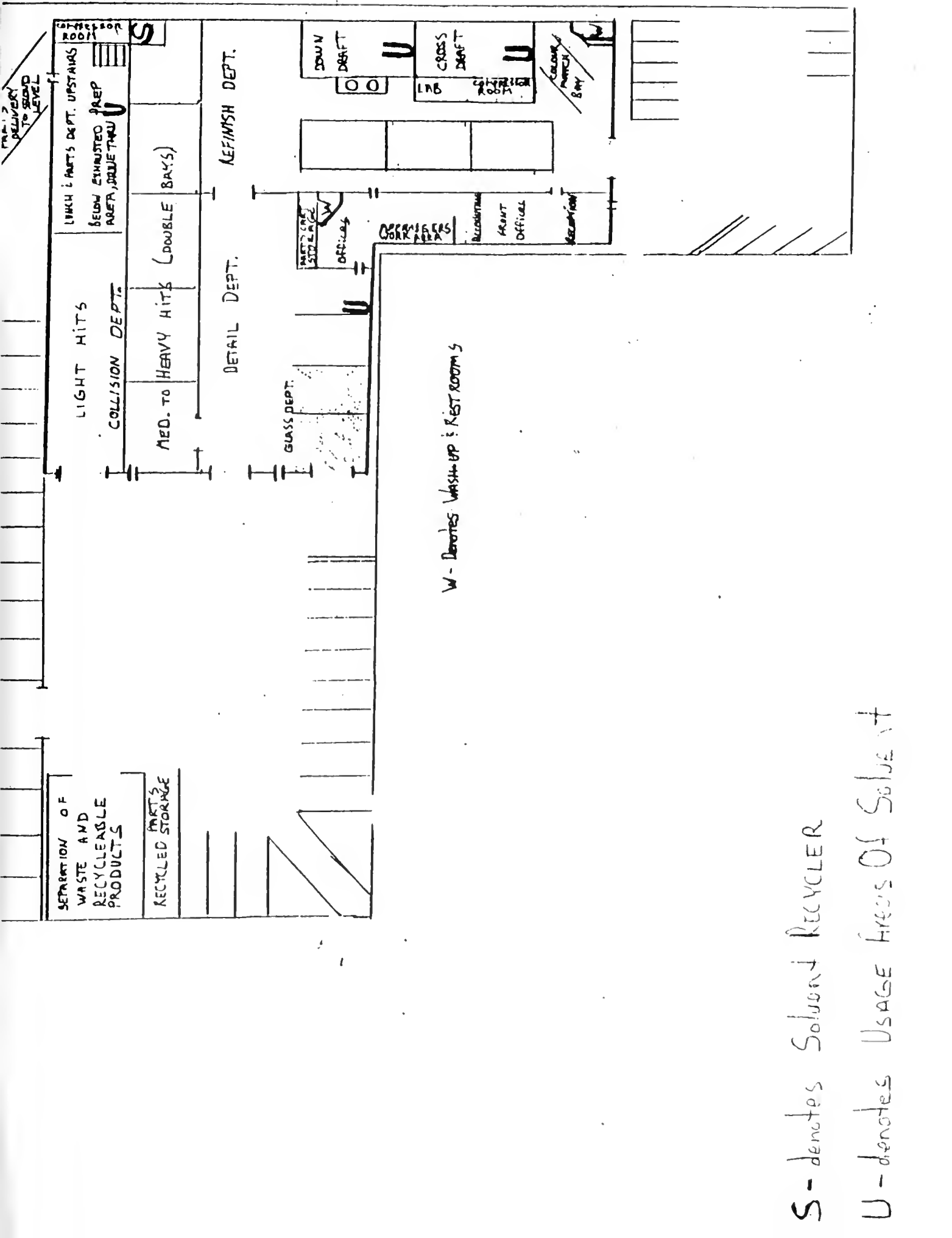
For workplaces with CLASS 1 DIVISION 1 explosion and fire requirements, the distillers are available in AD PE fire resistant versions complying with CEI 64-2 - CENELEC standards.

All models are approved by ONTARIO HYDRO.

Special plastic bags to fit the treatment tanks have been developed for easy removal of distillation residues.

AV recyclers are available in a wide range of models to meet all user requirements: automatic and manual charging, atmospheric pressure and vacuum operation.





The floor plan shows a building layout with the following departments and rooms:

- Top Left:** SEPARATION OF WASTE AND RECYCLEABLE PRODUCTS, RECYCLED STORAGE.
- Top Center:** LIGHT HITS, COLLISION DEPT., MED. TO HEAVY HITS (DOUBLE BAYS).
- Top Right:** LUNCH & PARTS DEPT. UPSTAIRS, BELOW EXHAUSTED PREP AREA, DOUBLE TAP.
- Middle Left:** GLASS DEPT., DETAIL DEPT., REFINISH DEPT.
- Middle Right:** DOWN DRAFT, CROSS DRAFT, LAB, COATING, COATING PUNCH BAY.
- Bottom Left:** WASH UP & REST ROOMS.
- Bottom Center:** COOKING AREA, OFFICES, RECEPTION, FRONT OFFICE, RECEPTION.
- Bottom Right:** COOKING AREA, OFFICES, RECEPTION, FRONT OFFICE, RECEPTION.

Legend:

- S - denotes Solvent RECYCLER
- U - denotes Usage Areas Of Solvent

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- Middle Right:** DOWN DRAFT, CROSS DRAFT, LAB, COATING PUNCH BAY.
- Bottom Left:** W - Denotes Washup & Rest Rooms.
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Waste Recycling Log

January	04/95	24L of Waste Solvent	21L of Re-usable Solvent
January	11/95	24L of Waste Solvent	21L of Re-usable Solvent
January	19/95	24L of Waste Solvent	21L of Re-usable Solvent
January	22/95	24L of Waste Solvent	21L of Re-usable Solvent
January	26/95	24L of Waste Solvent	21L of Re-usable Solvent
January	26/95	24L of Waste Solvent	21L of Re-usable Solvent
February	06/95	24L of Waste Solvent	21L of Re-usable Solvent
February	13/95	24L of Waste Solvent	21L of Re-usable Solvent
February	24/95	24L of Waste Solvent	21L of Re-usable Solvent
February	25/95	24L of Waste Solvent	21L of Re-usable Solvent
March	03/95	24L of Waste Solvent	21L of Re-usable Solvent
March	16/95	24L of Waste Solvent	21L of Re-usable Solvent
March	31/95	24L of Waste Solvent	21L of Re-usable Solvent
April	07/95	24L of Waste Solvent	21L of Re-usable Solvent
April	14/95	24L of Waste Solvent	21L of Re-usable Solvent
April	20/95	24L of Waste Solvent	21L of Re-usable Solvent
April	26/95	24L of Waste Solvent	21L of Re-usable Solvent
May	13/95	24L of Waste Solvent	21L of Re-usable Solvent
May	22/95	24L of Waste Solvent	21L of Re-usable Solvent
May	23/95	24L of Waste Solvent	21L of Re-usable Solvent
June	07/95	24L of Waste Solvent	21L of Re-usable Solvent
June	09/95	24L of Waste Solvent	21L of Re-usable Solvent
August	19/95	24L of Waste Solvent	21L of Re-usable Solvent
September	01/95	24L of Waste Solvent	21L of Re-usable Solvent
September	13/95	24L of Waste Solvent	21L of Re-usable Solvent
September	17/95	24L of Waste Solvent	21L of Re-usable Solvent
September	29/95	24L of Waste Solvent	21L of Re-usable Solvent
October	10/95	24L of Waste Solvent	21L of Re-usable Solvent
October	30/95	24L of Waste Solvent	21L of Re-usable Solvent
November	13/95	24L of Waste Solvent	21L of Re-usable Solvent
November	28/95	24L of Waste Solvent	21L of Re-usable Solvent
November	29/95	24L of Waste Solvent	21L of Re-usable Solvent
December	06/95	24L of Waste Solvent	21L of Re-usable Solvent
December	19/95	24L of Waste Solvent	21L of Re-usable Solvent

